Education and Training in Emergent Leadership

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> God, grant me the serenity to accept
> the things I cannot change,
> courage to change the things I can,
> and wisdom to know the difference.
> Reinhold Niebuhr.

Abstract

Aim of this article is to give answer to the question What can leadership do to support the emergence of innovation in a complex context? After an introduction, and before going into the results of the literature review the next paragraph gives clarity on the concepts used in the research question: complexity, emergence, innovation and leadership.

Keywords: complexity, emergence, innovation and leadership.

Introduction

Many quality improvement activities are planned. Leaders are strongly involved in missions, visions and strategic planning. They use, consciously or unconsciously, the PDCA-cycle (Deming, 1993). After the planning, it is carried out and the results or effects are measured. If the results show that the goals in the plan have not been achieved, adjustments are made in the next plan or in the execution of the processes. Then, the cycle is run through again. Traditionally, the PDCA-cycle is advocated as a

means to an end. Under the title 'The Myth of the PDCA cycle in times of emergent change', I questioned the role of the PDCA-cycle as being the center of quality management thinking for ages (Van Kemenade, 2014). PDCA is especially fit for planned, ordered, certain contexts. It fits with what Van Kemenade and Hardjono (2018) call the empirical and referential quality paradigm. For uncertain, unordered, unplanned processes, something else might be needed instead of Plan-Do-Check-Act. Due to the complexity of our society, the influence of the context, and the uncertainty in our world nowadays, not every activity can be planned anymore. At the same time organizations need to be more innovative than ever. That provides leaders with a problem. How to innovate without being able to plan?

In my training of leaders (mostly working in healthcare) this topic is raised continuously. Looking for an answer I encountered complexity science and the phenomenon of emergence. Complexity science studies the interactions of a diverse group of agents that bring about change in times of uncertainty, e.g. when radical innovation is co-created. This process is called emergence. Van Kemenade and Hardjono (2018) and Van Kemenade (2019) described the concept of emergence of innovation in (total) quality management. Van Kemenade (2019) defines emergence as 'the phenomenon where out of a network of interacting internal and external elements over time arises a coherent new pattern, that is different from its parts, irreducible to the separate parts unpredictable, unexpected and unplanned'. In the words of Ablowitz (1939) emergence accounts for the transformation of quantity into quality. If emergence can create innovation without planning in uncertain contexts, an important follow-up question is, if and how emergence can be facilitated, especially by leadership in and between organizations? Actually, this means that like many others do, I am searching

for what Johnson (2009) calls the Holy Grail of Complexity Science: control of emergence. For that purpose, I undertook a simple literature review.

Aim of this article is to give answer to the question *What can leadership do to support the emergence of innovation in a complex context?* Before going into the results of the literature review the next paragraph gives clarity on the concepts used in the research question: complexity, emergence, innovation and leadership.

Definition of Concepts

Complexity

Crucial now in leadership training is the notion of complexity. Complexity theory, which is the study of nonlinear dynamic systems promises to be a useful conceptual framework that reconciles the essential unpredictability of industries with the emergence of distinctive patterns (Cartwright 1991). During the 1990s, there was an explosion of interest in complexity as it relates to organizations and strategy. Often, complexity theory is mistaken for systems theory. Systems theory did discuss topics like complexity and self-organization long before complexity theory was born. Systems thinking is a way of knowing the complexity and trying to simplify it. In systems theory, complexity is that point where elements within a system find a balance and the internal and external are aligned to the best interest of the whole. Complexity theory, however, evolved from systems theory supported by cybernetics, system dynamics and chaos theory. Systems thinking and complexity theory are both attempting to make the leadership and management of actionable problems work as efficiently to the best target state possible. They both consider systems to be open and changing. They use the same language and concepts like emergence, self-organization, feedback loops. But, chaos theory led the thinking about complexity into a new direction. What is distinctive about

chaos theory, compared to systems theory, systems dynamics and cybernetics, is the clear identification of the limits of predictability. Chaos theory provides a radically different framework for studying complex dynamics. It highlights the limitations that are inherent in a reductionistic and mechanistic — linear cause and effect based — analysis of complex systems. Interconnectedness, unpredictability, and uncontrollability are key characteristics of all complex dynamic systems, such as healthcare systems everywhere. In dealing with complexity rather than mechanisms, the aim of science shifts from improving our ability to predict and control to aiming to better understand the dynamics and relationships of the systems we participate in through reflexivity so that our participation can be more appropriate.

Complexity theory became the study of the patterns that emerge as non-linear, networked systems evolve. Johnson (2009) adopts the definition of "complexity science" as "the study of the phenomena which emerge from a collection of interacting objects". Where Stacey et al. (2000) talk about complex responsive processes, others call these Complex Adaptive Systems (Goodwin, 1994, Holland, 1995).

More and more the differences between systems theory and complexity theory become clear.

The differences are listed in table 1.

Systems theory	Complexity theory
From simple to complicated systems	Complex systems (Snowden, 1999), complex responsive processes (Stacey et al. 2000), and complex adaptive systems (Allen, 2016)
Ordered systems	Un-ordered systems

Organisational development is the result of plans and actions of management.	All actions and interactions of all are important (Homan, 2013).
A rather steady state	Equilibrium dynamics
Many elements with moderately tangled relationships	Many actors with relationships that cannot be separated
Predictable	Unpredictable
Causal laws	Non-causal laws, one can observe the tendency of the system to move in a certain direction
Models on how the system works	The only valid model of the complex system is the system itself; t it is not possible to construct static models to represent reality, which is multiple, diverse and constantly changing.
Ideal future	Evolution of the present
Driven systems	Modulated systems, movement and direction is important
Humans are interchangeable widgets	Humans have agency and multiple identities
Humans are a part of a stable and homogeneous system which can be fully known through theories. Therefore, they are predictable and form a set that can be controlled through knowledge.	Humans are dynamic, uncertainty is an irremovable part of the human condition. Some types of systems (especially social and natural ones) actually evolve and create completely new variables and new actors.

It is possible to remain outside a complex system (a business, for example) to better control it.	Observers see themselves as integral parts of the system they observe.
Looking for certainty	Coping with uncertainty (Stacey et al., 2000)
Systems thinking will define at the very start a target solution and therefore assesses each component, their interactions and the process to achieve the target state.	Complexity theory is focusing on categorising the problem space (domain) so the right technique is used in the right context, and most significantly states the emphasis should be on understanding the current rather than target state and take each step as it comes.
Evidence-based	Acting into the unknown (Homan, 2013)
Reference paradigm	Emergence paradigm

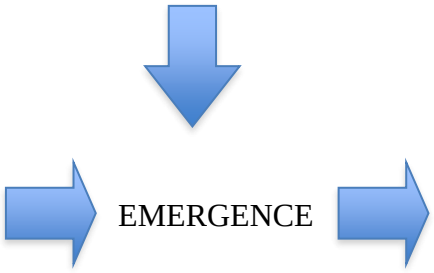
Table 1: Differences between systems theory and complexity theory.

Systems thinking and complexity do have a lot in common. However, where systems theory tries to keep or get control, in complexity theory *"people jointly create the meaning of what they are doing when they act into the un-known, co-creating their future in interaction with others"* (Stacey et al, 2000, p. 194). In complex adaptive systems, the whole (integrated care e.g.) is different than its parts (the separate healthcare institutes) and more complicated and meaningful than the aggregate of its parts. Complexity theory accepts the far-from-equilibrium wherein novelty may emerge.

Emergence

Emergence is a phenomenon that one can recognize in disciplines from biology to

organizational development. It can be seen in ants building a termite hill, in a flock of sparrows or in radical innovation in business. Sometimes it is referred to as collective intelligence. Van Kemenade (2019) conducted a concept analysis of emergence following Walker and Avant (2014). That led to attributes, antecedents and consequences of emergence (see table II). The antecedents describe what happened before the novelty occurred. They might hint to what one can do to make emergence happen: the reaction from complex adaptive systems, the reaction by the actors and reaction through specific activities.

	Attributes of emergence: • Interaction/synergy between internal and external elements • That occur at the same time (synchronicity) • Unpredictable • Unexpected • Unplanned • Leading to a new coherent pattern (novelty) • Irreducible to the separate parts.	
Antecedents of emergence Reaction from Complex, Adaptive Systems, Self-organization, Shared values / shared intentions, Visionary leadership, Reaction by actors, Non-linearity between the actors, Diverse Interdependent, Reaction through specific activities like Improvisation, Communication: informal/ through creative discourse and dialogue		Consequences of emergence: Innovation, breakthrough

The main consequence of emergence is innovation.

Table II: Antecedents, attributes and consequences of emergence according to Van Kemenade (2019).

Innovation

Rogers describes innovation as: Any idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, 1983, p. 11). In the emergence paradigm one speaks of novelty or radical innovation (Hardjono and Van Kemenade, 2020). Radical innovation is comparable to what Shiba & Walden (2006) calls breakthrough. The breakthrough can happen by a technology change, finding different customers or a supply-chain change (Shiba & Walden, 2006, p. 27). There is a debate on the extent to which innovation can be created by leadership.

Leadership

Scientists disagree on how much influence leaders can have on the emergence of innovation. Northouse (2015, p 6) defined leadership as *'a process whereby an individual influence a group of individuals to achieve a common goal'*. However, that is a limited definition, leadership nowadays is more a process that expands beyond the capabilities of the individual, where leadership itself is an emergent event, a product of 'relationships, complex interactions, and influences that occur in the "spaces between" individuals' (Lichtenstein et al., 2006). Or: leadership is a complex process that emerges in the interactive 'spaces between' people and ideas. Understanding the character of interaction between individuals is where the associated paradigms of complexity, emergence and leadership converge (Lichtenstein et al., 2006; Goldstein, 2008).

Poutanen et al. (2016) state that the complexity science perspective guides innovative managers and organizations to focus on the conditions that favour innovation rather than control. Lichtenstein (2009) pleas for 'opportunity tension' as a driver for

emergence. Opportunity tension is not a state, but 'a drive: 'an intensive push by the entrepreneurial leader(s) to capitalize on a time-sensitive opportunity, which is internally motivated by a felt urgency to take action now' (Lichtenstein, 2009, p.20). Lichtenstein puts it loud and clear*: "Emergence is driven by entrepreneurial behavior: someone sees a potential, an opportunity, a chance to generate value; and they put their passionate agency into making it real in the world"* (Lichtenstein, 2015, p.5). However, complexity science reframes leadership by focusing on the dynamic interactions between all individuals, explaining how those interactions can, under certain conditions, produce emergent outcomes (Lichtenstein and Plowman, 2009).

Others argue that a state of far-from-equilibrium increases innovation (e.g. Nonaka, 1988; Smith and Comer, 1991). In the complexity approach, "leadership" is not considered to be a person or persons. Rather, it is the recognizable pattern of organizing activity among autonomous heterogeneous individuals as they form into a system of action (Lichtenstein et al., 2006; Hazy, Goldstein and Lichtenstein, 2007; Uhl-Bien et al., 2007, Hazy and Uhl-Bien, 2012). Or even, like Johnson calls it: *The emergent phenomena typically arise in the absence of any sort of "invisible hand" or central controller* (Johnson, 2009, p. 15).

Formal and informal

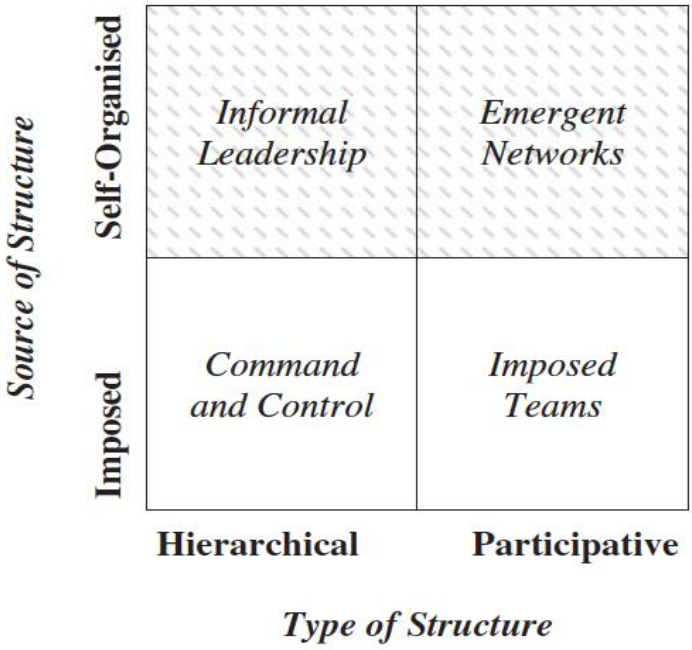


Figure 1: Source and type of structure according to Goldstein (2008)

Curral et al. (2016) focus on informal leadership leading to efficiency in self-managed teams. These research findings bring further support to the growing evidence that how leadership is thought and practiced should not be restricted to individual-centric approaches. Goldstein (2008) speaks of emergent leadership as informal leadership and emergent networks. He states that we can better understand the place of emergence in organizations through a two-by-two grid that relates the source of an organizational structure to its type (Figure 1; "source" refers to whether or not it is imposed, while "type of structure" identifies it as hierarchical or not). Participative leadership and self-organisation lead to emergent networks.

Curral et al. (2016) mention emergent networks like in the example of Katerina. They describe "how in the few hours that followed hurricane Katrina in 2005, groups of self-organized citizens coordinated themselves to rescue the victims and take them to dry land, while others built improvised facilities (e.g., hospitals) to accommodate the

injured and homeless. In contrast, in the week that followed this event formal action and command protocols failed to deliver a timely solution to the calamity. The complexity of the scenario after the Katrina was so high that centralized forms of leadership were insufficient to deliver an efficient response. Whereas centralized leadership structures proved unable to provide immediate solutions, decentralized forms of leadership led to the emergence of one self-organized complex adaptive system that was more efficient coping with the situation".

Shared leadership

Leadership is not anymore limited to the individual formal assigned leader. In complex contexts shared leadership is often preferred (e.g. Zappalla *et al.,* 2018). Complexity leadership theory (CLT) (Uhl-Bien 2006; Uhl-Bien and Marion 2009,) offers an interesting relational approach to leadership by viewing leadership as an emergent dynamic of different leadership functions that exceed the attempts of individual position holders. Shared leadership has been defined as "a dynamic, interactive influence process among individuals for which the objective is to lead one another to the achievement of group or organizational goals or both" (Pearce and Conger, 2003, p.1). Zappalla *et a*l. (2018) state that what distinguishes shared leadership from traditional forms of leadership is that the process of influencing team members is no longer a skill or role attributed to a single person, the appointed or elected leader; instead, it is broadly distributed within the team and involves downward and upward influences as well as peer or lateral ones. He refers to Barnett and Weidenfeller (2016) and Pearce and Conger (2003). And it is known that shared leadership fosters the emergence of novelty (Hoch,2013).

Marion and Uhl-Bien state: Complexity provides a bottom-up model of emergence, with complex leaders bonding (direct) and enabling (indirect) rather than

controlling the interactive dynamics that lead to creativity and fitness (Marion and Uhl-Bien, 2002). Lichtenstein et al. (2006b) stress how important shared leadership is for innovation. By focusing on how leadership may occur in any interaction, this new perspective dramatically expands the potential for creativity, influence, and positive change in an organization. More than simplistic notions of empowerment, this approach encourages all members to be leaders – to "own" their leadership within each interaction, potentially evoking a much broader array of responses from everyone in an organization. (page 8). That is confirmed by Kakar (2017) who states that vertical leadership was found to have a higher positive impact on team efficiency, shared leadership was found to have a higher positive impact on team innovation. Similarly, Hooker and Csikszentmihalyi (2003) state that: "As organisations increasingly need innovative and creative ideas (i.e. the transformation of knowledge) in the face of rapidly changing market environments, shared leadership may provide useful and timely assistance in boosting innovative potential (p. 219).

In general, we now know that complex adaptive systems play a part to create emergence of innovation. Formal as well as informal leaders can support this process. Shared leadership fosters the emergence of novelty and innovation. But still, *what exactly can leadership do to support the emergence of innovation in a complex context?*

Method

Data collection and data analysis

To answer the research questions a literature search was conducted. The topics 'emergent leadership' or 'complexity leadership' were chosen in a Boolean Phrase in two databases Academic Source Complete (ASC) and Business Source Premier (BSP). Inclusion-criteria were articles in peer-reviewed journals available in full text or online

from 2015-2020 on emergent leadership and complexity. The time frame was chosen due to the novelty of the topic. Exclusion criterion were emergence in other disciplines than organizational development or in the meaning of 'arising'. More articles were selected based on the snowballing strategy (Polit and Hunger, 1999), which was used to find the most relevant and applied sources of complexity theory in the area of emergence by investigating the references of the selected articles on the inclusion criteria. And through berry picking (Bates, 1989) more articles were added. The useful conclusions from the articles were merged and grouped together under overarching topics.

Findings

The search in ASC and BSP gave 45 hits. Twenty-six articles were excluded after reading the title and abstract based on the fact that they did not research the topic of emergent leadership and complexity. After reading the remaining articles as a whole one more was excluded because the article used emergent in the limited meaning of 'arising' and eight more were excluded because the topic did not match the research question of this article. That brings the total of this part of the search to 10 articles. The most relevant references from these articles were followed and included in our review. A complete reading of these added 12 extra articles. Through berry picking (Bates, 1989) 12 more articles were added. That brings the total of this literature search to 34. Figure 2 shows the flowchart of the literature search process.

	Literature search	
Data collected from	ASC	BSP
Search terms	(emergent AND leadership) OR	(emergent AND leadership) OR

	(complexity AND leadership)	(complexity AND leadership)
Inclusion criteria	Full-text/online availability Peer reviewed 2015-2020	Full-text/online availability Peer reviewed 2015-2020
	N = 31 hits	**N = 14 hits**
	After reading the title and abstract 23 excluded because of a wrong research topic **N = 8**	After reading the title and abstract 3 excluded because of a wrong research topic **N = 11**
	After reading whole article 1 excluded because emergent used in the sense of arising **N = 7**	After reading whole article 8 excluded because of a wrong research question **N = 3**
12 added with snowballing and 12		

added with berry- picking **N = 24**	Total articles search (#1) included **N = 34**

Figure 2: Flowchart literature search process

Conclusions

The content of the articles led to five topics: interaction, reflexivity, enabling, collective mindfulness and adaptive leadership.

Topic 1: Interaction.

Emergence is the phenomenon where out of a network of interacting internal and external elements over time arises a coherent new pattern, that is different from its parts, irreducible to the separate parts unpredictable, unexpected and unplanned (Van Kemenade, 2019). Several researchers stress the importance of this interaction (like Yezdany et al. 2015, Uhl-Bien *et al.*, 2007 and Craps *et al.*, 2019).

Leadership behaviours have the potential to foster the conditions necessary for emergence to occur through interactions with members across all levels of an organization, a concept that Macintosh and Maclean (1999) call conditioned emergence. Leadership can have an influence on the 'transformation from one archetype to another' by conditioning, creating far-from-equilibrium conditions and managing the feedback processes. Others like Tommasetti et al. (2019) talk about co-creation. Often the customer participates in this co-creation process.

Topic 2: Reflexivity

Craps et al. (2019) state that multi-actor governance brings together people with

diverging, often conflicting perspectives on problems, possible solutions, and suitable courses of action.

Leadership is enacted in 'relational practices' that can connect discordant ideas through the qualities of reflexivity and reciprocity in shared activities. As leadership develops out of and through the relations and interactions in the network, it is an emergent construction and not a given top down or outside–in facilitating force. Strengthening and promoting leadership practices according to the needs of the situation, thus, requires participants developing together reflexivity.

Topic 3: Enabling

Uhl-Bien et al. (2007,2009) identify 3 broad types of leadership: (1) leadership grounded in traditional, bureaucratic notions of hierarchy, alignment, and control (administrative leadership); (2) leadership that structures and enables conditions in which complex adaptive systems (CAS) can optimally address creative problem solving, adaptability, and learning (enabling leadership); and (3) leadership as a generative dynamic that underlies emergent change activities (adaptive leadership). In line with complexity leadership theory, efficiency can only be achieved if managers enable, rather than control, informal network dynamics (i.e., enabling and adaptive functions).

Exploring further through a meta-analysis of complexity leadership research, Plowman et al. (2007) identify three behavioural processes that co-generate the conditions for new emergent order: disrupting existing patterns of behaviour; encouraging novelty and sense-making from patterns and symbols. Lichtenstein and Plowman (2009) add a fourth process of stabilizing feedback. Macintosh and Maclean (1999) state that leadership can influence the 'transformation from one archetype to another' by conditioning, creating far-from-equilibrium conditions and managing the

feedback processes. Vera and Crossan (2014) state the importance of improvisation specifically theatrical improvisation for organisations. Sawyer (2015) describes the effect of improvisation as an enabler of innovation. Yezdani et al. (2015) explore a model-centred approach to augment the development and refinement of the theory of emergence. The focus is on the relational process of leadership as an emergent event in complex human organisations. Complexity theory applies an understanding of leadership and organisation less as an art of prediction, and more as one of sense-making, cultivated participation, interaction and influence between individuals across all levels of the organisation where leadership itself is viewed as an emergent event.

Poutanen et al. (2016) conclude their research on complexity and innovation as follows: the complexity science perspective guides innovative managers and organizations to focus on the conditions that favour innovation rather than control. Key elements that are necessary for the emergence of a new order, according to the complexity perspective, include permeable boundaries (e.g. open innovation strategy), interconnectedness (e.g. rich communication across the organization), self-organization of the system parts (e.g. the possibility to organize and re-organize according to swiftly changing environmental conditions), and adaptiveness (e.g. ambidexterity, or balancing between exploitation and exploration). Kim and Shin (2015) state that the leader's emotional competence is critical to managing group affect effectively, team leaders can shape group positive affect by facilitating team members' interactions and displaying emotions suitable for the task situation. Positive affect leads to collective efficacy and that leads to team creativity and innovation.

Bäcklander (2018) mentions the following characteristics of enabling leadership: increasing the context-sensitivity of others, supporting other leaders, establishing and

reinforcing simple principles, observing group dynamics, surfacing conflict and facilitating and encouraging constructive dialogue.

Imholte (2019) studied the emergence of a leader in a sports team without formal leadership titles. Findings revealed 4 main themes: navigating personal on-the-field failure, fulfilling others' expectations, helping teammates manage emotions, and fostering a fun working environment. Findings also indicated 1 foundational theme, having a philosophy, that grounded the 4 main themes. This relates to the importance of (shared) values as a reaction of a complex adaptive system to create novelty (Van Kemenade, 2019). This is confirmed by Dolan et al. (2000), who see values as attractors for the disorder that leads to innovation.

Topic 4: Mindfulness

Leadership flexibility or adaptiveness was mentioned by many articles (Poutanen et al., 2016, Uhl-Bien et al. 2007, Horvat, 2017, Van Kemenade, 2019, Macintosh and Maclean, 1999, Lichtenstein and Plowman, 2009). Baron et al. (2009) talk about mindfulness and the way it supports leadership flexibility and creativity.

King & Bedham (2019) state that the global rate of change and disruption is the highest it has ever been, and it is expected to increase. Their research deals with leadership in uncertainty. They promote attention in leadership programs for enhancing the adaptability, reliability and resilience of organizational cultures and systems. For that purpose, they suggest collective mindfulness. Collective mindfulness is effective in VUCA (Volatile Uncertain Complex Ambiguous) environments. Collective mindfulness is *'about the ability of groups and organizations to notice 'weak signals' of pending crises and have the motivation and capacity to respond to what they notice.* (King & Bedham, p.9).

Topic 5: Adaptive leadership

We already mentioned that Uhl-Bien et al. (2007,2009) mention adaptive leadership. Horvat (2017) states that there is a significant dependency between adaptive leadership and improvement, innovation, and learning maturity. In Complexity Leadership Theory, adaptive leadership drives emergence. By employing the benefits of adaptive leadership, such as involvement of people, bottom-up communication, personal power, and impact of people on one another, it is possible to foster effective organizational changes for a greater performance level. Table III presents the findings of 16 articles on leadership leading to a new emergent order gathered in 5 themes and 9 subthemes (column 2).

	Literature
Interaction by diverse and interdependent actors	Leadership Orchestrates Individual, Group & Intergroup Connections (Hazy & Uhl-Bien, 2012) Cultivated participation, interaction and influence between individuals across all levels of the organization (Yezdany et al. 2015) Interaction by diverse and interdependent actors (Van Kemenade, 2019) Multi-actor governance brings together people with diverging, often conflicting perspectives on problems, possible solutions and suitable courses of action. (Craps et al. 2019).
Reflexivity	Popa et al., 2014, Craps et al., 2019
Enabling	Catalysing adaptive dynamics (by fostering interaction, fostering interdependency and injecting adaptive tension—all mechanisms of CAS dynamics (Uhl-Bien et al., 2007).

Enabling by improvisation	Leadership promotes experimentation (Hazy & Uhl-Bien, 2012) Innovation emerges through improvisational processes (Sawyer, 2015) The reaction by improvisation (Van Kemenade, 2019)
Enabling by sense-making	Leadership Synthesizes Overlapping Models & Identities (Hazy & Uhl-Bien, 2012) Sense-making from patterns and symbols (Plowman et al. 2007, Lichtenstein & Plowman, 2009, Yezdany et al., 2015) Open innovative strategy (Poutanen et al., 2016)
Enabling by simple rules	Conditioning through new simple rules (Macintosh & Maclean, 1999) Establishing and reinforcing simple principles (Bäcklander,2018) the reaction by simple rules (Van Kemenade, 2019)
Enabling by a creative dialogue	The reaction through creative discourse and dialogue (Van Kemenade, 2019); dialogical leadership capabilities (Craps et al.,2019) Facilitating and encouraging constructive dialogue (Bäcklander, 2018)
Enabling by self-organisation	Self-organization of the system parts (e.g. the possibility to organize and re-organize according to swiftly changing environmental conditions) (Poutanen et al.,2016) Reaction from CAS: Self-organization (Van Kemenade, 2019)
Enabling by creating shared values	Values act as organisers or “attractors” of disorder (Dolan et al. 2000) Reaction from CAS: shared values (Van Kemenade, 2019) The reaction by visionary leadership (Van Kemenade, 2019) Having a philosophy to share (Imholte, 2019)
Mindfulness	Mindful attention fosters leadership flexibility (Baron et al, 2009)

Adaptivity	Adaptiveness (e.g. ambidexterity, or balancing between exploitation and exploration) (Poutanen et al., 2016, Uhl-Bien et al. 2007)
Adaptive by communication	Promoting High-Bandwidth Information Sharing (Hazy et al & Uhl-Bien, 2012) Adaptive leadership drives emergence by the involvement of people, bottom-up communication, personal power, and impact of people on one another. (Horvat, 2017) The reaction by often informal communication (Van Kemenade, 2019) Interconnectedness (e.g. rich communication across the organization) (Poutanen et al. 2016) Positive affect in the interaction for collective efficacy (Kim and Shin, 2015)
Adaptive by feedback	Managing feedback processes (Macintosh & Maclean, 1999) Stabilizing feedback (Lichtenstein & Plowman, 2009)

Table III: Findings of the literature search

For educational purposes it can be helpful to create a mnemonic. The five themes resulting from the literature search form the word IREMA (see figure 3). The Greek adverb ήρεμα (IREMA) means serenely (or calmly, placidly, restfully, slow ahead).

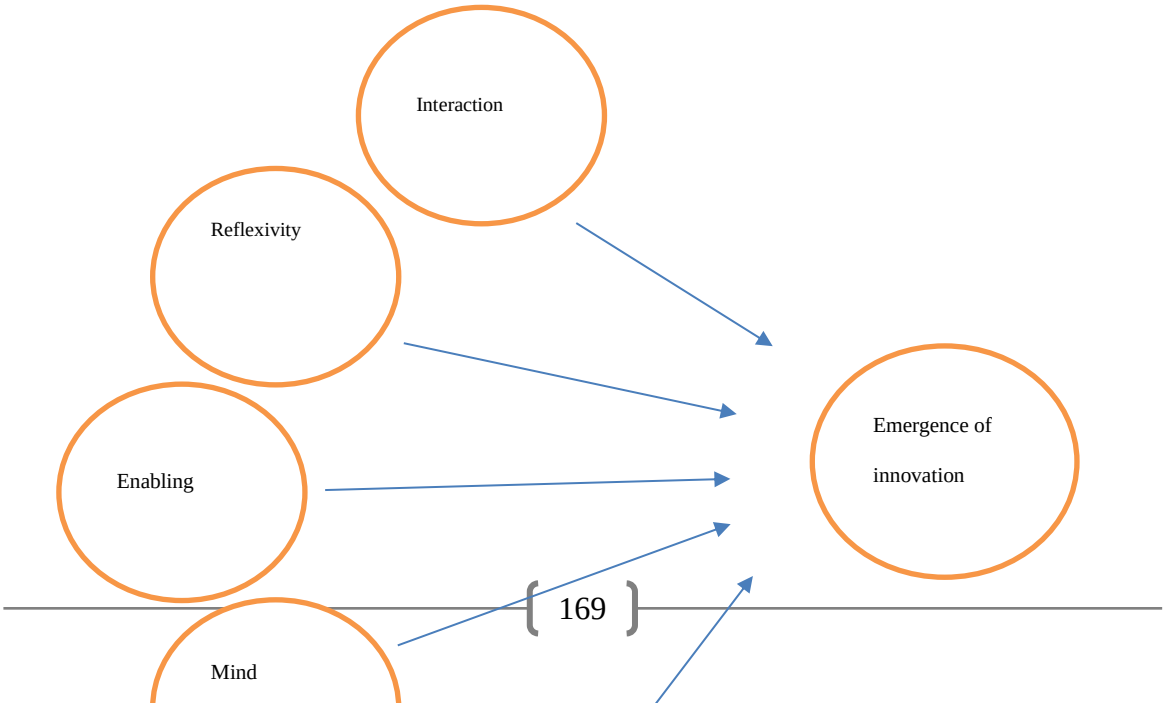


Figure 3: Irema, leading to the emergence of innovation.

Discussion

Aim of this article was to clarify how leadership can foster the emergence of innovation.

The literature review helped to adjust the content of the leadership education and training taking uncertainty and complexity into account. It is now proposed that the PDCA-cycle is not applicable in situations of uncertainty and large complexity. The IREMA-model seems to apply to leaders, individually and in a shared leadership setting, formal as well as informal. It supports the emergence of novelty. Lichtenstein (2011) makes a distinction between three degrees of emergence: order emergence, systemic emergence and radical emergence. The PDCA-cycle might be useful in the two lower degrees.

The relationship between collective mindfulness, leadership and innovation is worthwhile to investigate since quantitative evidence about the effect of mindfulness as a social practice across teams is only available for a small number of organisations (The Mindful Initiative, 2016, p. 16).

Also, the question to what extent the IREMA principles apply to everyone in every position, in the same way, needs further investigation. The concept of IREMA is worthwhile to implement in contemporary leadership trainings.

Several scientists state that organizations can engage in ongoing innovation by harnessing and embracing complexity rather than reducing it (Brown & Eisenhardt, 1997; Van de Ven et al., 1999, Garud et al. 2013). It relates to the concept Wei-Wu-Wei from Taoism. Wu-wei means no-action. Wu-wei is often associated with the behaviour of water. Water flows does no resist but can erode a stone. Water has no form; it runs everywhere and can fill the smallest spaces. It looks like if water does not act and still it does. Wu wei is about not resisting to the stream, choose out of the options where the flow is and accept the consequences, embracing the uncertainties. Now, Wei-Wu-Wei is about the action of non-action. It is about serenely knowing when to act and when not to.

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